

**ABSTRACT:**

The present invention relates to systems and methods for generating high resolution MR images of the fractional amount or percentage of fat content in an imaged object. In particular, the present invention relates to systems and methods for obtaining high resolution MR images of fat content with reduced NMR relaxation effects. Moreover, the present invention relates to systems and methods for obtaining high resolution MR images of fat content with reduced fat-percentage ambiguity. Furthermore, the present invention relates to systems and methods for diagnostic, and prognostic imaging where knowledge of fat content within tissues, organs, and lesions is beneficial to improve diagnostic accuracy, aid in risk assessment of future disease, and aid in assessment of therapeutic intervention.